

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of	)	
Application of Panasonic Avionics	)	Call Sign WF2XMD
Corporation To Modify Experimental	)	File No. _____
License To Replace Two Satellites as	)	
Authorized Points of Communication	)	
	)	

APPLICATION FOR EXPERIMENTAL LICENSE MODIFICATION

Panasonic Avionics Corporation (“Panasonic”), licensee of the “eXConnect” Ku-band aeronautical mobile-satellite system (“AMSS”) (“eXConnect System”), seeks to modify its experimental license¹ by replacing two satellites as authorized points of communication on its existing authorization. Panasonic seeks to replace two currently-authorized satellites which are no longer utilized for eXConnect operations, Horizons-1 and Galaxy 19, with two other satellites, Satmex 8 and SES-6, with which Panasonic must conduct testing and demonstration for FAA certification and other purposes.

The proposed operations are consistent with the coordinated parameters of the requested satellites, the Federal Communication Commission’s (“Commission” or “FCC”) two-degree spacing rules and the Commission’s rules and policies recently adopted for Ku-

¹ See ELS File No. 0210-EX-RR-2013, Call Sign WF2XMD (granted July 12, 2011). Panasonic subsequently modified this authorization to confirm compliance with ITU regulations and other applicable regulatory requirements. ELS File No. 0143-EX-ML-2012 (granted August 21, 2012). Panasonic then renewed this authorization. ELS File No. 0210-EX-RR-2013 (granted June 7, 2013) (“Experimental License”).

band earth stations aboard aircraft (“ESAAs”).² For the reasons described herein, grant of the proposed experimental license modification would serve the public interest.

I. DESCRIPTION OF EXPERIMENTAL OPERATIONS

Panasonic currently is authorized under its experimental license to operate twenty aircraft earth stations (“AESs”) of two types – ten Mitsubishi Electronics Company (“MELCO”) reflector terminals and ten Aura LE terminals³ – with the following four satellite points of communication: Horizons-1, Telstar 14, Galaxy 17 and Galaxy 19.⁴ Panasonic requires the ability to access Satmex 8 and SES-6 satellites points of communications to address certification testing and integration issues associated with operations onboard foreign-registered aircraft on flights to and from the United States. Access to Satmex 8 and SES-6 would substitute for Horizons-1 and Galaxy 19; therefore, there is no increase in the potential for interference because Panasonic seeks authority to communicate using the same number of terminals with the same number of satellite points of communication.

Concurrent herewith, Panasonic is filing an application to modify its commercial aeronautical mobile-satellite service (“AMSS”) blanket license to add Satmex 8 and SES-6, as

² See *Revisions to Parts 2 and 25 of the Commission’s Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz and 14.0-14.5 GHz Frequency Bands; Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, IB Docket Nos. 12-376 & 05-20, Notice of Proposed Rulemaking and Report and Order, FCC 12-161 (rel. Dec. 28, 2012) (“ESAA Order”).

³ The Aura LE terminal, previously manufactured by EMS Technologies, is now manufactured by Panasonic Avionics. The design and operational characteristics of the terminal have not changed.

⁴ See Experimental License at 1.

well as other satellites, as authorized points of communication.⁵ However, during the pendency of that application, there is a near-term need to access the proposed satellites for limited certification and network integration purposes.

Panasonic will conduct operations with Satmex 8 and SES-6 consistent with its existing experimental authority⁶ and incorporates by reference the technical information submitted in that proceeding. That technical information, as well as the detailed information filed in connection with Panasonic's recent Authorization⁷ and pending Modification Application,⁸ demonstrates the non-interfering operations of the eXConnect terminals and consistency with Ku-band AES licensing policies. Other than substituting access to Satmex 8 and SES-6 for Horizons 1 and Galaxy-19 as proposed herein, Panasonic seeks no changes to its existing experimental authority.

⁵ See Application of Panasonic Avionics Corporation To Modify AMSS License To Permit Operation of Up to 2000 Technically Identical Aeronautical Mobile-Satellite Service ("AMSS") Aircraft Earth Stations ("AESs") in the 14.0-14.5 GHz and 10.7-12.75 GHz Frequency Bands, Call Sign E100089, File No. SES-MFS-20130930-00845 (filed Sept. 30, 2013) ("Modification Application").

⁶ *Id.*

⁷ Radio Station Authorization to Panasonic Avionics Corporation, File No. SES-MFS-20120913-00818, Call Sign: E100089 (July 24, 2013) (granting authority to Panasonic to operate up to 50 (.68 cm antennas) MELCO remote terminals in CONUS, AK, HI and U.S. Territories and operate up to 2000 (.89 M. antennas) remote AURA LE remote terminals) ("Authorization"); Radio Station Authorization to Panasonic Avionics Corporation, File No. SES-AFS-20130220-00189, Call Sign: E100089 (July 24, 2013) (granting authority to Panasonic to operate up to 15 (.68 cm antennas) MELCO remote terminals in CONUS, AK, HI and U.S. Territories and operate up to 2000 (.89 M. antennas) remote AURA LE remote terminals) ("Authorization"); Satellite Communications Services Information re: Actions Taken, *Public Notice*, Report No. SES-01573 (July 31, 2013).

⁸ Extensive technical information is available in the record of Panasonic's pending commercial license modification. See Modification Application at Technical Appendix.

II. SATELLITE POINTS OF COMMUNICATION

Panasonic seeks authority for the Aura LE terminal to communicate with Satmex 8 and SES-6 satellites, and for the MELCO terminal to communicate with SES-6. In addition, Panasonic seeks to remove Horizons-1 and Galaxy 19 points of communication from its experimental license because Panasonic no longer utilizes these two satellites for eXConnect operations. Panasonic, therefore, need not conduct further demonstration or certification testing with these satellites.

Panasonic proposes to modify its existing experimental license by listing the following satellites as authorized points of communication:

- Galaxy 17 at 91°W
- Telstar 14R at 63°W
- Satmex 8 at 116.8°W
- SES-6 at 40.5°W

Panasonic will access these satellites within parameters consistent with its existing experimental license. Accordingly, grant of the requested license modification would not increase the potential for interference from Panasonic's experimental operations.

Satmex 8 is a Mexico-licensed satellite included on the Commission's Permitted Space Station List for Fixed Satellite Service ("FSS").⁹ SES-6, which successfully launched in June 2013,¹⁰ is a Netherlands-licensed space station included on the Permitted Space Station List for

⁹ Satelites Mexicanos S. A. de C. V. Petition for Declaratory Ruling to add the Satmex 8 satellite to the Permitted Space Station List, File No. SAT-PPL-20120823-00140 (Call Sign S2873) (granted Dec 6, 2012).

¹⁰ Letter from Daniel C.H. Mah, Regulatory Counsel for New Skies Satellites B.V., to Marlene H. Dortch, Sec'y of the Fed. Commc'ns Comm'n (June 13, 2013) in File No. SAT-PPL-2012-0717-00117 (Call Sign S2870).

FSS.¹¹ In support of this application, Panasonic is submitting letters from the operators of Satmex 8 and SES-6 to Panasonic confirming that the proposed Ku-band AMSS operations are consistent with each operators' coordination agreements and will not result in unacceptable interference to other satellite operations.¹²

eXConnect terminals have operated with satellites around the world without a single reported case of interference. Panasonic does not seek to extend the term of its existing authorization or add to the number of terminals.¹³ Panasonic seeks to ensure its authority to address certification, integration and implementation issues while it actively pursues full commercial licensing.¹⁴

Given that the subject terminals installed on foreign aircraft already communicate with the above-referenced satellites outside U.S. airspace without causing interference, no material concerns would be raised by adding these satellites to Panasonic's existing experimental license authorization. Panasonic's track record of non-interfering operations further establish that authority for the proposed experimental operations can be granted expeditiously as requested herein.

¹¹ New Skies Satellites B.V., Request for U.S. Market Access for SES-6, Petition, File No. SAT-PPL-2012-0717-00117 (Call Sign S2870) (granted July 17, 2013); Policy Branch Information Actions Taken, *Public Notice*, Report No. SAT-00962, File No. SAT-PPL-2012-0717-00117 (Call Sign S2870) (July 19, 2013).

¹² See Attached Technical Appendix.

¹³ Because the eXConnect network is a TDMA-based system, Panasonic would note that only one terminal ever transmits at one particular time.

¹⁴ See Modification Application.

IV. CONCLUSION

Grant of the license modification application would enable Panasonic to address certification and implementation issues and further develop its eXConnect System for U.S. and foreign-registered aircraft operating on flights to and from the United States. Panasonic respectfully requests that the Commission expeditiously grant the proposed experimental license modification in order to facilitate the continued implementation of in-flight connectivity offerings to passengers and crews onboard foreign-registered aircraft.

ATTACHMENT 1

Technical Appendix

Technical Appendix

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**Satmex 8
Coverage Map**



Sutmex 8 Link Budget

Forward Link Budget			Return Link Budget		
eXConnect Terminal			eXConnect Terminal		
Site	Maine		Site	Maine	
Antenna Type	AURA LE		Antenna Type	AURA LE	
Lat	44.5 deg		Lat	44.5 deg	
Lon	-69.2 deg		Lon	-69.2 deg	
EIRP max	42.9 dBW		EIRP max	42.9 dBW	
G/T	10.1 dB/K		G/T	10.1 dB/K	
Satellite			Satellite		
Name	SM8		Name	SM8	
Longitude	-116.8 deg		Longitude	-116.8 deg	
Hub Earth Station			Hub Earth Station		
Site	Brewster		Site	Brewster	
Lat	48.1 deg		Lat	48.1 deg	
Lon	-119.8 deg		Lon	-119.8 deg	
EIRP max	77.0 dBW		EIRP max	77.0 dBW	
G/T	37.4 dB/K		G/T	37.4 dB/K	
Signal			Signal		
Waveform	DVB-S2 iDX2		Waveform	iDirect	
Modulation	QPSK		Modulation	BPSK	
Bits per symbol	2		Bits per symbol	1	
Spread Factor	1		Spread Factor	2	
Coding Rate	0.83		Coding Rate	0.67	
Overhead Rate	0.93		Overhead Rate	0.72	
Channel Spacing	1.20		Channel Spacing	1.20	
Spectral Efficiency (Rate/Noise BW)	1.56 bps/Hz		Spectral Efficiency (Rate/Noise BW)	0.24 bps/Hz	
Data Rate	4.67E+07 bps		Data Rate	1.61E+06 bps	
Information Rate (Data + Overhead)	5.00E+07 bps		Information Rate (Data + Overhead)	2.22E+06 bps	
Symbol Rate	3.00E+07 Hz		Symbol Rate	3.34E+06 Hz	
Chip Rate (Noise Bandwidth)	3.00E+07 Hz		Chip Rate (Noise Bandwidth)	6.67E+06 Hz	
Occupied Bandwidth	3.60E+07 Hz		Occupied Bandwidth	8.00E+06 Hz	
Power Equivalent Bandwidth	3.60E+07 Hz		Power Equivalent Bandwidth	8.34E+04 Hz	
C/N Threshold	5.6 dB		C/N Threshold	-1.2 dB	
Uplink			Uplink		
Frequency	14.250 GHz		Frequency	14.250 GHz	
Back off	3.9 dB		Back off	0.0 dB	
EIRP Spectral Density	34.3 dBW/4kHz		EIRP Spectral Density	10.7 dBW/4kHz	
Slant Range	38211 km		Slant Range	39503 km	
Space Loss, Ls	207.2 dB		Space Loss, Ls	207.5 dB	
Pointing Loss, Lpnt	0.0 dB		Pointing Loss, Lpnt	0.1 dB	
Atmosphere / Weather Loss, La	1.0 dB		Atmosphere / Weather Loss, La	0.0 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
Transponder G/T @ Hub	4.0 dB/K		Transponder G/T @ Terminal	5.0 dB/K	
Thermal Noise, C/No	97.6 dBHz		Thermal Noise, C/No	68.9 dBHz	
C/(No+Io)	97.1 dBHz		C/(No+Io)	68.4 dBHz	
Satellite			Satellite		
Flux Density	-90.5 dBW/m2		Flux Density	-120.2 dBW/m2	
SFD @ Hub	-88.2 dBW/m2		SFD @ Terminal	-89.2 dBW/m2	
Small Signal Gain (IBO/OBO)	1.3 dB		Small Signal Gain (IBO/OBO)	1.3 dB	
OBO	1.0 dB		OBO	29.7 dB	
Downlink			Downlink		
Frequency	12.000 GHz		Frequency	12.000 GHz	
Transponder Sat. EIRP @ Beam Peak	51.7 dBW		Transponder Sat. EIRP @ Beam Peak	51.7 dBW	
Transponder Sat. EIRP @ Terminal	50.9 dBW		Transponder Sat. EIRP @ Hub	48.9 dBW	
DL PSD Limit	14.5 dBW/4kHz		DL PSD Limit	14.5 dBW/4kHz	
DL PSD @ Beam Peak	11.9 dBW/4kHz		DL PSD @ Beam Peak	-10.2 dBW/4kHz	
Carrier EIRP @ Beam Peak	50.7 dBW		Carrier EIRP @ Beam Peak	22.0 dBW	
Carrier EIRP @ Terminal	49.9 dBW		Carrier EIRP @ Hub	19.3 dBW	
Slant Range	39503 km		Slant Range	38211 km	
Space Loss, Ls	205.9 dB		Space Loss, Ls	205.7 dB	
Pointing Loss, Lpnt	0.1 dB		Pointing Loss, Lpnt	0.0 dB	
Atmosphere / Weather Loss, La	0.0 dB		Atmosphere / Weather Loss, La	1.2 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
PCMA Loss	0.0 dB		PCMA Loss	0.0 dB	
Thermal Noise, C/No	82.6 dBHz		Thermal Noise, C/No	78.3 dBHz	
C/(No+Io)	82.4 dBHz		C/(No+Io)	77.8143 dBHz	
End to End			End to End		
End to End C/(No+Io)	82.2 dBHz		End to End C/(No+Io)	67.9 dBHz	
Implementation Loss	1.5 dB		Implementation Loss	0.0 dB	
End to End C/N w/ Imp Loss	5.9 dB		End to End C/N w/ Imp Loss	-0.3 dB	
Link Margin	0.3 dB		Link Margin	0.9 dB	



September 26, 2013

Mark DeFazio
Manager, GCS Regulatory and Business Operations
Panasonic Avionics Corporation
26200 Enterprise Way
Lake Forest, CA 92630

Re: Certification of Conformance with Satellite Operator Coordination Agreements

Dear Mr. DeFazio:

You have requested that Satelites Mexicanos S. A. de C.V. ("Satmex") confirm it has reviewed the technical characteristics of Panasonic Avionics Corporation's ("Panasonic") Ku-band aeronautical mobile-satellite service ("AMSS") operations with the Satmex 8 satellite at 116.8° W.L., using the "North American" beam of this satellite. You have further requested that Satmex certify that such operations are consistent with Satmex's coordination agreements and will not result in unacceptable interference to other satellite operations within +/- 6 degrees of Satmex 8.

As set forth in materials submitted to the U.S. Federal Communications Commission ("FCC"), the basic characteristics of the Panasonic phased-array ("PPA") aircraft earth station ("AES") terminal (referred to previously as the "Aura LE" terminal) for operation with the Satmex 8 satellite include:

Antenna Dimensions	0.89 m (0.17m in height)
Type of Antenna	Dual panel waveguide feed phased array
SSPA Rated Output Power	16 watts
Bandwidth	Receive: 11.7 GHz to 12.2 GHz Transmit: 14.0 GHz to 14.5 GHz
Transmit Gain	37 dBi at 14.25 GHz
EIRP	48 dBW
Transmit Polarization	Linear: Horizontal or Vertical
Receive G/T	10 to 14 dB/K
Transmit Azimuth Beamwidth	1.5 degrees
Transmit Elevation Beamwidth	4 degrees
Pointing Accuracy	0.2 degrees (3-sigma, automatic cut-off at 0.35 degrees offset)



We understand that the PPA AES terminal is designed to comply with the FCC's rules and policies governing Ku-band earth stations aboard aircraft ("ESAAs") adopted in new Section 25.227 of the rules.¹ In addition, the PPA AES terminal has operated without interference under various FCC experimental and commercial authorizations.²

The PPA AES terminal avoids interference to other satellite operations by limiting off-axis EIRP spectral density towards orbital slots 118.7° and 114.9° to no more than 27 dBW/ MHz, through various means, including: (i) limiting transmit power spectral density by controlling the transmit power of the terminal and using spread spectrum technology (selecting appropriate carrier bandwidths and spread factors); (ii) controlling the off-axis gain of the antenna along the GSO by inhibiting transmissions when the skew angle exceeds a specified threshold; and (iii) controlling pointing error and inhibiting transmissions when the pointing offset exceeds the specified threshold of 0.35 degrees.

When operating as described in the materials submitted to the FCC and with the associated off-axis EIRP density envelope for the Satmex 8 satellite (which is consistent with the Commission's two-degree spacing requirements), Panasonic's proposed operations comply with the off-axis EIRP density level requirements necessary to protect potentially affected satellites up to and including 6° off-axis from the Satmex 8 satellite (including the satellites in applicable coordination agreements) and it is not expected to cause unacceptable interference into these adjacent satellites. The skew angle is constantly monitored by the antenna control system and the aircraft transmission will be muted in the event the skew angle of +/-35° is exceeded.

Satmex understands that the maximum downlink satellite EIRP density of 13.0 dBW/4kHz, the operational level of the Ku-band AMSS network operated by Panasonic, is routinely used without causing unacceptable interference to adjacent satellite operations.

Satmex understands that the maximum uplink off-axis EIRP spectral density limit of $-50 + (29 - 25 * \text{Log}_{10}(\theta))$ dBW/Hz with a maximum uplink EIRP of 48dBW up to a 1668ksps carrier, where θ is the off-axis angle, is the operational level of the Ku-band AMSS network operated by Panasonic, and is routinely used without causing unacceptable interference to adjacent satellite operations.

¹ 47 C.F.R. § 25.227.

² See File Nos. SES-LIC-20100805-00992, SES-AMD-20100914-01163, SES-AMD-20101115-01432, SES-AMD-20110325-00358; SES-AFS-20110405-00402, SES-STA-20110104-00005 (Call Sign: E100089) (granted Aug. 31, 2011); ELS File Nos. 0210-EX-RR-2013 (granted July 12, 2011), 0143-EX-ML-2012 (granted August 21, 2012), 0210-EX-RR-2013 (granted June 7, 2013) (Call Sign WF2XMD).

A handwritten signature in black ink, consisting of a stylized 'J' followed by a series of loops and a final flourish.



In view of the foregoing and consultations between Satmex engineering staff and Panasonic, Satmex hereby confirms the following:

1. Satmex is familiar with the technical characteristics of the PPA AES terminal.
2. The proposed operations of the PPA AES terminal with the Satmex 8 satellite have the potential to receive harmful interference from adjacent satellite networks that may be unacceptable.
3. The power density levels and associated off-axis gain performance of its PPA AES terminal that Panasonic provided to Satmex are consistent with the existing coordination agreements between Satmex and the adjacent satellite systems within 6° of orbital separation from the Satmex 8 satellite.
4. Pursuant to the international regulation for the AMSS services, Satmex will include the power-density levels and associated off-axis gain performance of its PPA AES terminal of the proposed operations in all future coordination agreements for the Satmex 8 satellite.
5. Operation of the PPA AES terminal will not cause unacceptable interference into other operations on Satmex 8, or adjacent satellites, and are otherwise in accordance with Satmex's technical requirements and applicable operational limitations, including coordinated off-axis EIRP density levels.

Please let me know if you require any additional information regarding Panasonic's operation of the Ku-band PPA AMSS terminal with the Satmex 8 satellite.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hector Fortis', written over a horizontal line.

Hector Fortis
SATMEX
International and Regulatory Affairs

A handwritten signature in black ink, consisting of a stylized 'J' followed by a flourish, written over a horizontal line.

Satmex 8

Emissions Designators

Satellite and Beam Name	Tx/Rx	Emission Designator	Bandwidth (Hz)	Max EIRP per Carrier (dBW)	Max EIRP Density Per Carrier (dBW/4kHz)
Satmex-8	Tx	500KG7D	500,000	34.70	14.52
Satmex-8	Tx	9M00G7D	9,000,000	47.25	14.52
Satmex-8	Rx	1M20G7D	1,200,000		
Satmex-8	Rx	36M0G7D	36,000,000		

SES-6
Coverage Map

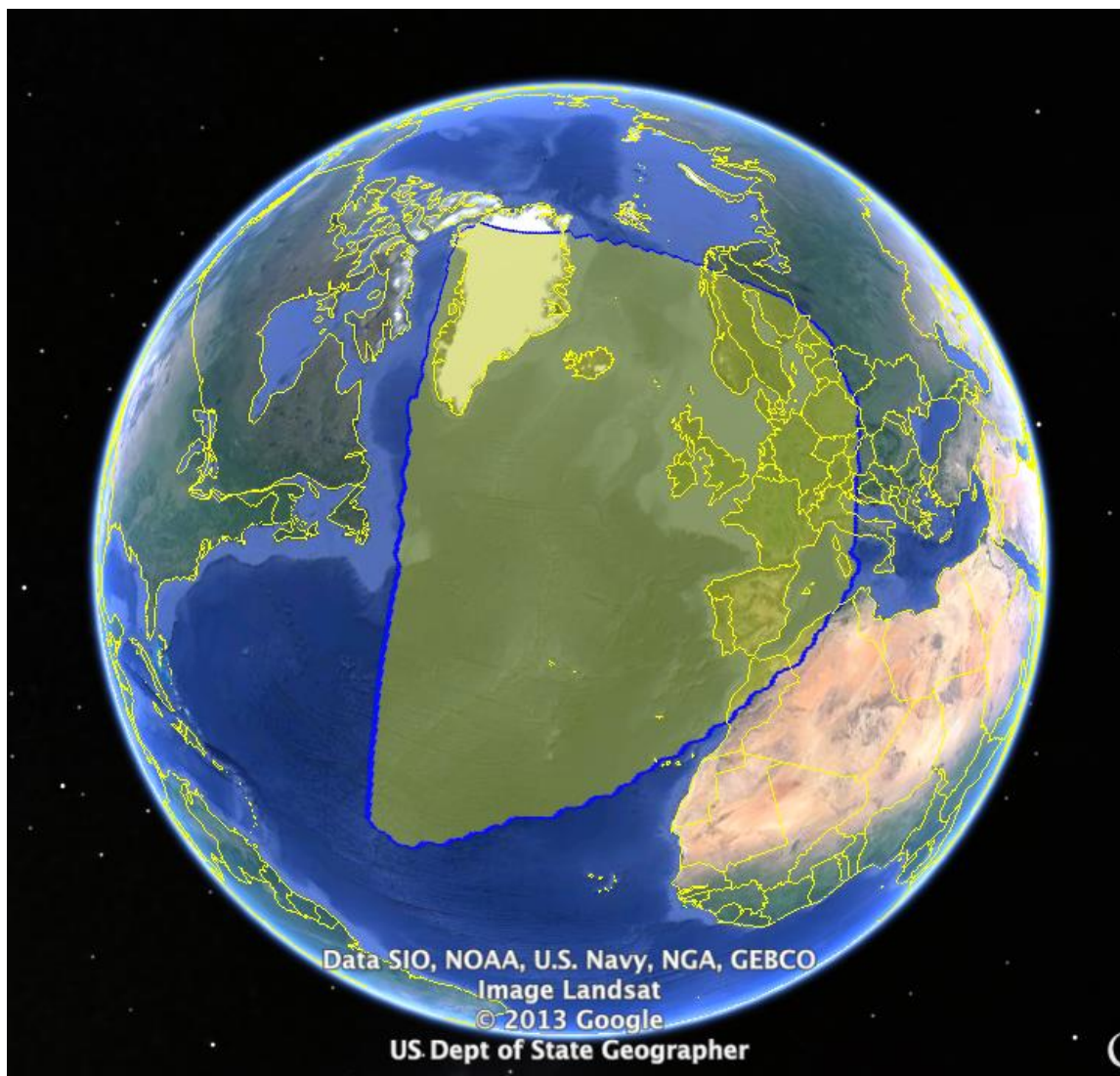


Figure 1: SES-6 AE Coverage

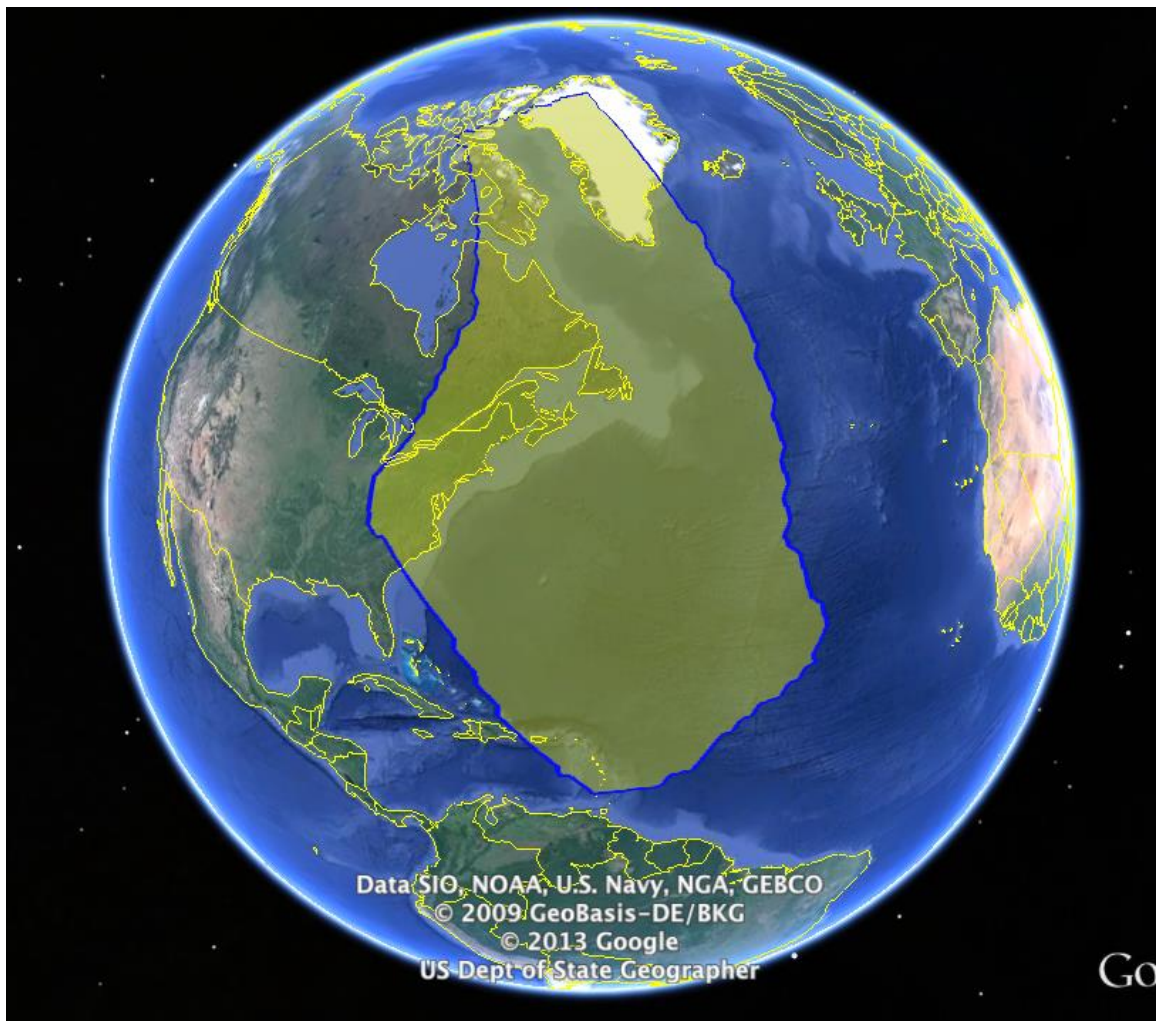


Figure 2: SES-6 AW Coverage

SES-6 Link Budget

Forward Link Budget		Return Link Budget	
eXConnect Terminal		eXConnect Terminal	
Antenna Type	AURA LE	Antenna Type	AURA LE
Lat	63.7 deg	Lat	63.7 deg
Lon	-18.4 deg	Lon	-18.4 deg
EIRP max	42.5 dBW	EIRP max	42.5 dBW
G/T	10.0 dB/K	G/T	10.0 dB/K
Satellite		Satellite	
Name	SES-6	Name	SES-6
Longitude	-40.5 deg	Longitude	-40.5 deg
Hub Earth Station		Hub Earth Station	
Site	Cologne	Site	Cologne
Lat	50.863 deg	Lat	50.863 deg
Lon	6.848 deg	Lon	6.848 deg
EIRP max	80.0 dBW	EIRP max	80.0 dBW
G/T	35.0 dB/K	G/T	35.0 dB/K
Signal		Signal	
Waveform	DVB-S2 iDX2	Waveform	iDirect
Modulation	QPSK	Modulation	BPSK
Bits per symbol	2	Bits per symbol	1
Spread Factor	1	Spread Factor	4
Coding Rate	0.67	Coding Rate	0.66
Overhead Rate	0.94	Overhead Rate	0.75
Channel Spacing	1.20	Channel Spacing	1.20
Spectral Efficiency (Rate/Noise BW)	1.26 bps/Hz	Spectral Efficiency (Rate/Noise BW)	0.12 bps/Hz
Data Rate	5.66E+07 bps	Data Rate	8.27E+05 bps
Information Rate (Data + Overhead)	6.00E+07 bps	Information Rate (Data + Overhead)	1.10E+06 bps
Symbol Rate	4.50E+07 Hz	Symbol Rate	1.67E+06 Hz
Chip Rate (Noise Bandwidth)	4.50E+07 Hz	Chip Rate (Noise Bandwidth)	6.67E+06 Hz
Occupied Bandwidth	5.40E+07 Hz	Occupied Bandwidth	8.00E+06 Hz
Power Equivalent Bandwidth	7.20E+07 Hz	Power Equivalent Bandwidth	6.09E+05 Hz
C/N Threshold	3.5 dB	C/N Threshold	-3.5 dB
Uplink		Uplink	
Frequency	14.250 GHz	Frequency	14.250 GHz
Back off	1.7 dB	Back off	0.0 dB
EIRP Spectral Density	37.8 dBW/4kHz	EIRP Spectral Density	10.3 dBW/4kHz
Slant Range	39858 km	Slant Range	39969 km
Space Loss, Ls	207.4 dB	Space Loss, Ls	207.4 dB
Pointing Loss, Lpnt	0.0 dB	Pointing Loss, Lpnt	0.1 dB
Atmosphere / Weather Loss, La	2.5 dB	Atmosphere / Weather Loss, La	0.0 dB
Radome, Lr	0.0 dB	Radome, Lr	0.0 dB
Transponder G/T @ Hub	1.0 dB/K	Transponder G/T @ Terminal	3.0 dB/K
Thermal Noise, C/No	98.1 dBHz	Thermal Noise, C/No	66.6 dBHz
C/(No+Io)	97.6 dBHz	C/(No+Io)	66.1 dBHz
Satellite		Satellite	
Flux Density	-87.2 dBW/m2	Flux Density	-120.7 dBW/m2
SFD @ Hub	-87.2 dBW/m2	SFD @ Terminal	-89.2 dBW/m2
Small Signal Gain (IBO/OBO)	0.0 dB	Small Signal Gain (IBO/OBO)	3.0 dB
OBO	0.0 dB	OBO	28.5 dB
Downlink		Downlink	
Frequency	12.000 GHz	Frequency	12.000 GHz
Transponder Sat. EIRP @ Beam Peak	49.2 dBW	Transponder Sat. EIRP @ Beam Peak	49.2 dBW
Transponder Sat. EIRP @ Terminal	49.0 dBW	Transponder Sat. EIRP @ Hub	47.0 dBW
DL PSD Limit	13.0 dBW/4kHz	DL PSD Limit	13.0 dBW/4kHz
DL PSD @ Beam Peak	8.7 dBW/4kHz	DL PSD @ Beam Peak	-11.5 dBW/4kHz
Carrier EIRP @ Beam Peak	49.2 dBW	Carrier EIRP @ Beam Peak	20.7 dBW
Carrier EIRP @ Terminal	49.0 dBW	Carrier EIRP @ Hub	18.5 dBW
Slant Range	39969 km	Slant Range	39858 km
Space Loss, Ls	205.4 dB	Space Loss, Ls	205.4 dB
Pointing Loss, Lpnt	0.1 dB	Pointing Loss, Lpnt	0.0 dB
Atmosphere / Weather Loss, La	0.0 dB	Atmosphere / Weather Loss, La	2.6 dB
Radome, Lr	0.0 dB	Radome, Lr	0.0 dB
PCMA Loss	0.0 dB	PCMA Loss	0.0 dB
Thermal Noise, C/No	82.1 dBHz	Thermal Noise, C/No	74.0 dBHz
C/(No+Io)	81.9 dBHz	C/(No+Io)	73.1616 dBHz
End to End		End to End	
End to End C/(No+Io)	81.8 dBHz	End to End C/(No+Io)	65.3 dBHz
Implementation Loss	1.5 dB	Implementation Loss	0.0 dB
End to End C/N w/ Imp Loss	3.7 dB	End to End C/N w/ Imp Loss	-2.9 dB
Link Margin	0.2 dB	Link Margin	0.6 dB

Figure 1: SES-6 AE Link Budget

Forward Link Budget		Return Link Budget	
eXConnect Terminal		eXConnect Terminal	
Antenna Type	AURA LE	Antenna Type	AURA LE
Lat	74.4 deg	Lat	74.4 deg
Lon	-71.9 deg	Lon	-71.9 deg
EIRP max	42.5 dBW	EIRP max	42.5 dBW
G/T	10.0 dB/K	G/T	10.0 dB/K
Satellite		Satellite	
Name	SES-6	Name	SES-6
Longitude	-40.5 deg	Longitude	-40.5 deg
Hub Earth Station		Hub Earth Station	
Site	Cologne	Site	Cologne
Lat	50.86 deg	Lat	50.86 deg
Lon	6.848 deg	Lon	6.848 deg
EIRP max	74.5 dBW	EIRP max	74.5 dBW
G/T	35.0 dB/K	G/T	35.0 dB/K
Signal		Signal	
Waveform	DVB-S2 iDX2	Waveform	iDirect
Modulation	QPSK	Modulation	BPSK
Bits per symbol	2	Bits per symbol	1
Spread Factor	1	Spread Factor	8
Coding Rate	0.33	Coding Rate	0.67
Overhead Rate	0.92	Overhead Rate	0.72
Channel Spacing	1.20	Channel Spacing	1.20
Spectral Efficiency (Rate/Noise BW)	0.61 bps/Hz	Spectral Efficiency (Rate/Noise BW)	0.06 bps/Hz
Data Rate	2.32E+07 bps	Data Rate	4.03E+05 bps
Information Rate (Data + Overhead)	2.53E+07 bps	Information Rate (Data + Overhead)	5.56E+05 bps
Symbol Rate	3.79E+07 Hz	Symbol Rate	8.33E+05 Hz
Chip Rate (Noise Bandwidth)	3.79E+07 Hz	Chip Rate (Noise Bandwidth)	6.67E+06 Hz
Occupied Bandwidth	4.55E+07 Hz	Occupied Bandwidth	8.00E+06 Hz
Power Equivalent Bandwidth	7.20E+07 Hz	Power Equivalent Bandwidth	2.88E+05 Hz
C/N Threshold	-0.8 dB	C/N Threshold	-7.2 dB
Uplink		Uplink	
Frequency	14.250 GHz	Frequency	14.250 GHz
Back off	1.1 dB	Back off	0.0 dB
EIRP Spectral Density	33.7 dBW/4kHz	EIRP Spectral Density	10.3 dBW/4kHz
Slant Range	39858 km	Slant Range	41170 km
Space Loss, Ls	207.4 dB	Space Loss, Ls	207.6 dB
Pointing Loss, Lpnt	0.0 dB	Pointing Loss, Lpnt	0.1 dB
Atmosphere / Weather Loss, La	2.5 dB	Atmosphere / Weather Loss, La	0.0 dB
Radome, Lr	0.0 dB	Radome, Lr	0.0 dB
Transponder G/T @ Hub	0.0 dB/K	Transponder G/T @ Terminal	0.0 dB/K
Thermal Noise, C/No	92.2 dBHz	Thermal Noise, C/No	63.3 dBHz
C/(No+Io)	91.7 dBHz	C/(No+Io)	62.8 dBHz
Satellite		Satellite	
Flux Density	-92.1 dBW/m2	Flux Density	-120.9 dBW/m2
SFD @ Hub	-86.1 dBW/m2	SFD @ Terminal	-86.2 dBW/m2
Small Signal Gain (IBO/OBO)	3.0 dB	Small Signal Gain (IBO/OBO)	3.0 dB
OBO	3.0 dB	OBO	31.7 dB
Downlink		Downlink	
Frequency	12.000 GHz	Frequency	12.000 GHz
Transponder Sat. EIRP @ Beam Peak	48.1 dBW	Transponder Sat. EIRP @ Beam Peak	47.0 dBW
Transponder Sat. EIRP @ Terminal	47.0 dBW	Transponder Sat. EIRP @ Hub	47.0 dBW
DL PSD Limit	13.0 dBW/4kHz	DL PSD Limit	13.0 dBW/4kHz
DL PSD @ Beam Peak	5.3 dBW/4kHz	DL PSD @ Beam Peak	-17.0 dBW/4kHz
Carrier EIRP @ Beam Peak	45.1 dBW	Carrier EIRP @ Beam Peak	15.3 dBW
Carrier EIRP @ Terminal	44.0 dBW	Carrier EIRP @ Hub	15.3 dBW
Slant Range	41170 km	Slant Range	39858 km
Space Loss, Ls	205.7 dB	Space Loss, Ls	205.4 dB
Pointing Loss, Lpnt	0.1 dB	Pointing Loss, Lpnt	0.0 dB
Atmosphere / Weather Loss, La	0.0 dB	Atmosphere / Weather Loss, La	2.6 dB
Radome, Lr	0.0 dB	Radome, Lr	0.0 dB
PCMA Loss	0.0 dB	PCMA Loss	0.0 dB
Thermal Noise, C/No	76.8 dBHz	Thermal Noise, C/No	70.8 dBHz
C/(No+Io)	76.6 dBHz	C/(No+Io)	69.9147 dBHz
End to End		End to End	
End to End C/(No+Io)	76.5 dBHz	End to End C/(No+Io)	62.0 dBHz
Implementation Loss	1.5 dB	Implementation Loss	0.0 dB
End to End C/N w/ Imp Loss	-0.8 dB	End to End C/N w/ Imp Loss	-6.2 dB
Link Margin	0.0 dB	Link Margin	1.0 dB

Figure 2: SES-6 AW Link Budget



30 August 2013

Mark DeFazio
Manager, GCS Regulatory and Business Operations
Panasonic Avionics Corporation
26200 Enterprise Way
Lake Forest, CA 92630

Re: Certification of Coordination for Operation with SES-6

Dear Mr. DeFazio:

You have requested that New Skies Satellites B.V. ("New Skies," doing business as "SES") confirm it has reviewed the technical characteristics of Panasonic Avionics Corporation's ("Panasonic") Ku-band aeronautical mobile-satellite service ("AMSS") operations with the SES-6 satellite at 40.5° W.L., using the East Atlantic ("ATE") and West Atlantic ("ATW") Ku-band beams of this satellite. You have further requested that SES certify such operations have been included in and are consistent with SES's coordination agreements, and will not result in unacceptable interference to other satellite operations within +/- 6 degrees of SES-6.

Given the location and coverage area of the SES-6 satellite, we understand that Panasonic seeks to operate in excess of the two-degree spacing levels adopted by the U.S. Federal Communications Commission ("FCC") for routine Ku-band earth station licensing¹ and embodied in off-axis EIRP spectral density mask applicable to Ku-band mobile VSAT operations.² Specifically, Panasonic seeks to operate at off-axis EIRP spectral density levels up to 5 dB higher than the FCC mask, which is consistent with the coordinated levels of the SES-6 satellite and permitted by the FCC rules.³ In addition, SES understands that the FCC has granted Panasonic with authority for such higher power operations with other satellites (up to the coordinated levels of the serving satellite).⁴

¹ See 47 C.F.R. §25.218(f).

² See 47 C.F.R. §§25.222(a)(1)(i)(a), 25.226(a)(1)(i)(a) and 25.227(a)(1)(i)(a).

³ See 47 C.F.R. §§25.222(a)(2), 25.226(a)(2) and 25.227(a)(2).

⁴ Panasonic Avionics Corporation, Radio Station Authorization, Call Sign E100089, File No. SES-MFS-20120913-00818 (granted July 24, 2013) ("Blanket AES License") and Application

The FCC has authorized Panasonic to operate two Ku-band AMSS aircraft earth station (“AES”) terminal types: the Panasonic phased-array (“PPA”) terminal (referred to previously as the “Aura LE”) and the MELCO terminal.⁵ The basic characteristics of these terminals set forth in the FCC authorization and associated materials submitted to the FCC include:

Antenna	PPA AES	MELCO
Dimensions	0.89 m (0.17 m in height)	0.68 m (0.18 m in height)
Type of Antenna	Dual panel waveguide fed phased array	Elliptical, mechanically steered cassegrain
Max. Input Power at Antenna Flange	16 watts	9.9 watts
Bandwidth	10.95-11.2 GHz; 11.45-12.2 GHz (receive); 14.0-14.5 GHz (transmit)	10.95-11.2 GHz; 11.45-12.2 GHz (receive); 14.0-14.4 GHz (transmit)
Transmit Gain	37 dBi at 14.25 GHz	32.2 dBi at 14.25 GHz
Max. EIRP	48 dBW	42.1 dBW
Transmit Polarization	Horizontal or Vertical	Horizontal or Vertical
Receive G/T	10 to 14 dB/K	8.0 to 9.3 dB/K
Transmit Azimuth Beamwidth	1.5 degrees	1.5 degrees
Transmit Elevation Beamwidth	4 degrees	5.6 degrees
Pointing Accuracy	0.2 degrees (3-sigma, automatic cut-off at 0.35 degrees offset)	0.25 degrees (3-sigma, automatic cut-off at 0.5 degrees offset)

We understand that the PPA AES and MELCO terminals are designed to comply with the FCC’s rules and policies governing Ku-band earth stations aboard aircraft (“ESAAs”) adopted in new Section 25.227 of the rules.⁶ In addition, the terminals have operated without interference under various FCC experimental and commercial authorizations.⁷

Narrative at 8-10, 14 (confirming higher power operations with certain satellite points of communication, including Eutelsat 10A).

⁵ See Blanket AES License at 3 (Section E – Antenna Facilities).

⁶ 47 C.F.R. § 25.227.

⁷ See File Nos. SES-LIC-20100805-00992, SES-AMD-20100914-01163, SES-STA-20110104-00005 (Call Sign: E100089); ELS File Nos. 0210-EX-RR-2013 (granted July 12, 2011), 0143-EX-



The PPA AES and MELCO terminals avoid interference to other satellite operations by limiting off-axis EIRP spectral density to no more than coordinated levels through various means, including: (i) limiting transmit power spectral density by controlling the transmit power of the terminal and using spread spectrum technology (selecting appropriate carrier bandwidths and spread factors); (ii) controlling the off-axis gain of the antenna along the GSO by inhibiting transmissions when the skew angle exceeds a specified threshold; and (iii) controlling pointing error and inhibiting transmissions when the pointing offset exceeds the specified threshold (0.35 degrees for the PPA AES; 0.5 degrees for the MELCO).

When operating in the manner authorized by the FCC and with the associated off-axis EIRP density envelope for the SES-6 satellite (which is 5 dB higher than the Commission's two-degree spacing levels), Panasonic's proposed operations comply with the off-axis EIRP density levels necessary to protect potentially affected satellites up to and including 6° off-axis from the SES-6 satellite and will not cause unacceptable interference into these adjacent satellites.

SES confirms that the maximum downlink satellite EIRP density of 13.0 dBW/KHz, the operational level of the Ku-band AMSS network operated by Panasonic, is routinely used without causing unacceptable interference to adjacent satellite operations.

In view of the foregoing and consultations between SES engineering staff and Panasonic, SES hereby confirms the following:

1. SES is familiar with the technical characteristics of the PPA AES and MELCO terminals.
2. The proposed operations of the PPA AES and MELCO terminals with the SES-6 satellite have the potential to receive harmful interference from adjacent satellite networks that may be unacceptable.
3. The power density levels and associated off-axis gain performance of its PPA AES and MELCO terminals that Panasonic provided to SES are consistent with the existing coordination agreements between SES and the adjacent satellite systems within 6° of orbital separation from the SES-6 satellite.
4. SES will include the power-density levels and associated off-axis gain performance of its PPA AES and MELCO terminals of the proposed operations in all future coordination agreements for the SES-6 satellite.

ML-2012 (granted August 21, 2012), 0210-EX-RR-2013 (granted June 7, 2013) (Call Sign WF2XMD).



5. Operation of the PPA AES and MELCO terminals will not cause unacceptable interference into other operations on SES-6, or adjacent satellites, and are otherwise in accordance with SES' technical requirements and applicable operational limitations, including coordinated off-axis EIRP density levels.

Please let me know if you require any additional information regarding Panasonic's operation of the PPA AES or MELCO terminals on the SES-6 satellite.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kimberly M. Baum".

Kimberly M. Baum

Vice President, Spectrum Management and Development

SES-6

Emissions Designators for PPA (Aura LE)

Satellite and Beam Name	Tx/Rx	Emission Designator	Bandwidth (Hz)	Max EIRP per Carrier (dBW)	Max EIRP Density Per Carrier (dBW/4kHz)
SES-6 AW	Tx	500KG7D	500,000	40.00	19.82
SES-6 AW	Tx	9M00G7D	9,000,000	48.00	15.27
SES-6 AW	Rx	1M20G7D	1,200,000		
SES-6 AW	Rx	54M0G7D	54,000,000		
SES-6 AE	Tx	500KG7D	500,000	41.60	21.42
SES-6 AE	Tx	9M00G7D	9,000,000	48.00	15.27
SES-6 AE	Rx	1M20G7D	1,200,000		
SES-6 AE	Rx	54M0G7D	54,000,000		

SES-6-AE MELCO

Link Budget

Forward Link Budget			Return Link Budget		
eXConnect Terminal			eXConnect Terminal		
Antenna Type	MELCO		Antenna Type	MELCO	
Lat	69.7 deg		Lat	69.7 deg	
Lon	-39.4 deg		Lon	-39.4 deg	
EIRP max	47.2 dBW		EIRP max	47.2 dBW	
G/T	9.3 dB/K		G/T	9.3 dB/K	
Satellite			Satellite		
Name	SES-6-AE		Name	SES-6-AE	
Longitude	-40.5 deg		Longitude	-40.5 deg	
Hub Earth Station			Hub Earth Station		
Site	Cologne		Site	Cologne	
Lat	50.863 deg		Lat	50.863 deg	
Lon	6.848 deg		Lon	6.848 deg	
EIRP max	75.5 dBW		EIRP max	75.5 dBW	
G/T	35.0 dB/K		G/T	35.0 dB/K	
Signal			Signal		
Waveform	DVB-S2		Waveform	iDirect	
Modulation	QPSK		Modulation	BPSK	
Bits per symbol	2		Bits per symbol	1	
Spread Factor	1		Spread Factor	4	
Coding Rate	0.50		Coding Rate	0.43	
Overhead Rate	0.83		Overhead Rate	0.68	
Channel Spacing	1.20		Channel Spacing	1.20	
Spectral Efficiency (Rate/Noise BW)	0.83 bps/Hz		Spectral Efficiency (Rate/Noise BW)	0.07 bps/Hz	
Data Rate	1.86E+07 bps		Data Rate	4.86E+05 bps	
Information Rate (Data + Overhead)	2.25E+07 bps		Information Rate (Data + Overhead)	7.19E+05 bps	
Symbol Rate	2.25E+07 Hz		Symbol Rate	1.67E+06 Hz	
Chip Rate (Noise Bandwidth)	2.25E+07 Hz		Chip Rate (Noise Bandwidth)	6.67E+06 Hz	
Occupied Bandwidth	2.70E+07 Hz		Occupied Bandwidth	8.00E+06 Hz	
Power Equivalent Bandwidth	7.20E+07 Hz		Power Equivalent Bandwidth	6.65E+05 Hz	
C/N Threshold	0.9 dB		C/N Threshold	-5.0 dB	
Uplink			Uplink		
Frequency	14.250 GHz		Frequency	14.250 GHz	
Back off	0.2 dB		Back off	2.0 dB	
EIRP Spectral Density	37.8 dBW/4kHz		EIRP Spectral Density	13.0 dBW/4kHz	
Slant Range	39858 km		Slant Range	40395 km	
Space Loss, Ls	207.4 dB		Space Loss, Ls	207.5 dB	
Pointing Loss, Lpnt	0.0 dB		Pointing Loss, Lpnt	0.4 dB	
Atmosphere / Weather Loss, La	2.5 dB		Atmosphere / Weather Loss, La	0.0 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
Transponder G/T @ Hub	1.0 dB/K		Transponder G/T @ Terminal	1.0 dB/K	
Thermal Noise, C/No	95.1 dBHz		Thermal Noise, C/No	67.0 dBHz	
C/(No+Io)	94.6 dBHz		C/(No+Io)	66.5 dBHz	
Satellite			Satellite		
Flux Density	-90.2 dBW/m2		Flux Density	-118.3 dBW/m2	
SFD @ Hub	-87.2 dBW/m2		SFD @ Terminal	-87.2 dBW/m2	
Small Signal Gain (IBO/OBO)	2.0 dB		Small Signal Gain (IBO/OBO)	3.0 dB	
OBO	1.0 dB		OBO	28.1 dB	
Downlink			Downlink		
Frequency	12.000 GHz		Frequency	12.000 GHz	
Transponder Sat. EIRP @ Beam Peak	49.2 dBW		Transponder Sat. EIRP @ Beam Peak	49.2 dBW	
Transponder Sat. EIRP @ Terminal	48.0 dBW		Transponder Sat. EIRP @ Hub	47.0 dBW	
DL PSD Limit	13.0 dBW/4kHz		DL PSD Limit	13.0 dBW/4kHz	
DL PSD @ Beam Peak	10.7 dBW/4kHz		DL PSD @ Beam Peak	-11.2 dBW/4kHz	
Carrier EIRP @ Beam Peak	48.2 dBW		Carrier EIRP @ Beam Peak	21.1 dBW	
Carrier EIRP @ Terminal	47.0 dBW		Carrier EIRP @ Hub	18.9 dBW	
Slant Range	40395 km		Slant Range	39858 km	
Space Loss, Ls	205.5 dB		Space Loss, Ls	205.4 dB	
Pointing Loss, Lpnt	0.3 dB		Pointing Loss, Lpnt	0.0 dB	
Atmosphere / Weather Loss, La	0.0 dB		Atmosphere / Weather Loss, La	2.6 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
PCMA Loss	0.0 dB		PCMA Loss	0.0 dB	
Thermal Noise, C/No	79.1 dBHz		Thermal Noise, C/No	74.4 dBHz	
C/(No+Io)	77.1 dBHz		C/(No+Io)	73.5499 dBHz	
End to End			End to End		
End to End C/(No+Io)	77.1 dBHz		End to End C/(No+Io)	65.7 dBHz	
Implementation Loss	1.5 dB		Implementation Loss	0.0 dB	
End to End C/N w/ Imp Loss	2.0 dB		End to End C/N w/ Imp Loss	-2.6 dB	
Link Margin	1.1 dB		Link Margin	2.4 dB	

SES-6-AW MELCO

Link Budget

Forward Link Budget			Return Link Budget		
eXConnect Terminal			eXConnect Terminal		
Antenna Type	MELCO		Antenna Type	MELCO	
Lat	74.4 deg		Lat	74.4 deg	
Lon	-71.9 deg		Lon	-71.9 deg	
EIRP max	47.2 dBW		EIRP max	47.2 dBW	
G/T	9.3 dB/K		G/T	9.3 dB/K	
Satellite			Satellite		
Name	SES-6-AW		Name	SES-6-AW	
Longitude	-40.5 deg		Longitude	-40.5 deg	
Hub Earth Station			Hub Earth Station		
Site	Cologne		Site	Cologne	
Lat	50.86 deg		Lat	50.86 deg	
Lon	6.848 deg		Lon	6.848 deg	
EIRP max	75.5 dBW		EIRP max	75.5 dBW	
G/T	35.0 dB/K		G/T	35.0 dB/K	
Signal			Signal		
Waveform	DVB-S2		Waveform	iDirect	
Modulation	QPSK		Modulation	BPSK	
Bits per symbol	2		Bits per symbol	1	
Spread Factor	1		Spread Factor	4	
Coding Rate	0.40		Coding Rate	0.43	
Overhead Rate	0.93		Overhead Rate	0.68	
Channel Spacing	1.20		Channel Spacing	1.20	
Spectral Efficiency (Rate/Noise BW)	0.74 bps/Hz		Spectral Efficiency (Rate/Noise BW)	0.07 bps/Hz	
Data Rate	1.67E+07 bps		Data Rate	4.86E+05 bps	
Information Rate (Data + Overhead)	1.80E+07 bps		Information Rate (Data + Overhead)	7.18E+05 bps	
Symbol Rate	2.25E+07 Hz		Symbol Rate	1.67E+06 Hz	
Chip Rate (Noise Bandwidth)	2.25E+07 Hz		Chip Rate (Noise Bandwidth)	6.67E+06 Hz	
Occupied Bandwidth	2.70E+07 Hz		Occupied Bandwidth	8.00E+06 Hz	
Power Equivelent Bandwidth	7.20E+07 Hz		Power Equivelent Bandwidth	3.96E+05 Hz	
C/N Threshold	0.2 dB		C/N Threshold	-5.0 dB	
Uplink			Uplink		
Frequency	14.250 GHz		Frequency	14.250 GHz	
Back off	0.1 dB		Back off	3.1 dB	
EIRP Spectral Density	37.9 dBW/4kHz		EIRP Spectral Density	11.9 dBW/4kHz	
Slant Range	39858 km		Slant Range	41170 km	
Space Loss, Ls	207.4 dB		Space Loss, Ls	207.6 dB	
Pointing Loss, Lpnt	0.0 dB		Pointing Loss, Lpnt	0.4 dB	
Atmosphere / Weather Loss, La	2.5 dB		Atmosphere / Weather Loss, La	0.0 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
Transponder G/T @ Hub	0.0 dB/K		Transponder G/T @ Terminal	0.0 dB/K	
Thermal Noise, C/No	94.2 dBHz		Thermal Noise, C/No	64.7 dBHz	
C/(No+Io)	93.7 dBHz		C/(No+Io)	64.2 dBHz	
Satellite			Satellite		
Flux Density	-90.1 dBW/m2		Flux Density	-119.6 dBW/m2	
SFD @ Hub	-86.1 dBW/m2		SFD @ Terminal	-86.2 dBW/m2	
Small Signal Gain (IBO/OBO)	3.0 dB		Small Signal Gain (IBO/OBO)	3.0 dB	
OBO	1.0 dB		OBO	30.4 dB	
Downlink			Downlink		
Frequency	12.000 GHz		Frequency	12.000 GHz	
Transponder Sat. EIRP @ Beam Peak	48.1 dBW		Transponder Sat. EIRP @ Beam Peak	47.0 dBW	
Transponder Sat. EIRP @ Terminal	47.0 dBW		Transponder Sat. EIRP @ Hub	47.0 dBW	
DL PSD Limit	13.0 dBW/4kHz		DL PSD Limit	13.0 dBW/4kHz	
DL PSD @ Beam Peak	9.6 dBW/4kHz		DL PSD @ Beam Peak	-15.6 dBW/4kHz	
Carrier EIRP @ Beam Peak	47.1 dBW		Carrier EIRP @ Beam Peak	16.6 dBW	
Carrier EIRP @ Terminal	46.0 dBW		Carrier EIRP @ Hub	16.6 dBW	
Slant Range	41170 km		Slant Range	39858 km	
Space Loss, Ls	205.7 dB		Space Loss, Ls	205.4 dB	
Pointing Loss, Lpnt	0.3 dB		Pointing Loss, Lpnt	0.0 dB	
Atmosphere / Weather Loss, La	0.0 dB		Atmosphere / Weather Loss, La	2.6 dB	
Radome, Lr	0.0 dB		Radome, Lr	0.0 dB	
PCMA Loss	0.0 dB		PCMA Loss	0.0 dB	
Thermal Noise, C/No	77.9 dBHz		Thermal Noise, C/No	72.2 dBHz	
C/(No+Io)	76.0 dBHz		C/(No+Io)	71.2930 dBHz	
End to End			End to End		
End to End C/(No+Io)	75.9 dBHz		End to End C/(No+Io)	63.4 dBHz	
Implementation Loss	1.5 dB		Implementation Loss	0.0 dB	
End to End C/N w/ Imp Loss	0.9 dB		End to End C/N w/ Imp Loss	-4.8 dB	
Link Margin	0.7 dB		Link Margin	0.2 dB	

SES-6

Emissions Designators for MELCO

Satellite and Beam Name	Tx/Rx	Emission Designator	Bandwidth (Hz)	Max EIRP per Carrier (dBW)	Max EIRP Density Per Carrier (dBW/4kHz)
SES-6 AW - MELCO	Tx	500KG7D	500,000	32.10	11.92
SES-6 AW - MELCO	Tx	9M00G7D	9,000,000	44.65	11.92
SES-6 AW - MELCO	Rx	1M20G7D	1,200,000		
SES-6 AW - MELCO	Rx	54M0G7D	54,000,000		
SES-6 AE - MELCO	Tx	500KG7D	500,000	33.20	13.02
SES-6 AE - MELCO	Tx	9M00G7D	9,000,000	45.75	13.02
SES-6 AE - MELCO	Rx	1M20G7D	1,200,000		
SES-6 AE - MELCO	Rx	54M0G7D	54,000,000		